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No Shortage of Tanks!

The Canadian Army's System for the Recovery, Repair and Replacement of A and B Vehicles and Major Weapons Systems

ARTHUR GULLACHSEN

Abstract: This article is an overview of the First Canadian Army in North West Europe's ability to recover, repair and damaged, destroyed and broken down vehicles and weapons systems. This capability was a crucial factor in maintaining the overall combat power of the Canadian Army Overseas during operations in the last year of war. To support this argument the author examines Canadian wartime primary documents as well as multiple secondary sources.

GIVEN THE HIGH INTENSITY of combat operations during the Canadian Army's period of service in North West Europe (NWE) during the last eleven months of the war in 1944-1945, an effective system of equipment recovery, repair and replacement was essential. While what has been written on wartime equipment and vehicle repair, recovery and replacement has mainly focussed on German armoured forces 1939-1945, little focus has been devoted to researching these capabilities within Allied units. Whether or not a Canadian unit's offensive and defensive capabilities were at a high level during this time period was dependent on the number of

operational vehicles and major weapons systems that were available.¹ The “A” and “B” categories of vehicle classification, taken from the British Army system, encompassed nearly all vehicles within the Canadian Army in the late war period. The “A” vehicle category included nearly all heavy and light armoured combat types and the “B” classification encompassed all lighter, soft-skinned, wheeled supply and general service types. If a unit’s equipment inventories were significantly below their war establishment levels, its level of military effectiveness would be impaired. These establishment levels were the organizational guides that determined how each combat arms unit was equipped in the way of personnel, vehicles, equipment and weapons in order to conduct its mission. Canadian units suffered equipment losses due to all causes, and often at a rapid rate within infantry, armoured and anti-tank regiments, often making their real strength below war establishment levels. Unit activity and exposure to enemy action determined how rapidly losses such as this occurred. Accidents and normal wear and tear were also unrelenting, taking vehicles and weapons systems out of action just as effectively as enemy action.

The operational record, systems and structure of First Canadian Army’s repair and replacement services for “A” and “B” vehicles and major weapons systems in NWE will be examined within this article. That these organizations were remarkably successful at achieving their main goal of maintaining the combat strength of the Canadian Army Overseas (CAO) is the conclusion presented. The historical significance of these processes lies in their level of effectiveness. Nearly always fully functional, these processes allowed Canadian combat formations to maintain their strength in the face of a sustained level of high losses over an extended period. By addressing the question of how Canadian combat arms units maintained their equipment strength, this article contributes to the wider debate on Allied military effectiveness, the value of the size of the Allied support units compared to combat units, and aids the goal of a larger understanding of the unique methods used by the Western Allies to pursue their war aims.

¹ LAC, RG 24 Volume 10,553, 21st AG. A & B Canadian Vehicle Position Report, File 215A21.085 (D1). Monthly returns from May 1944 to May 1945 detail exactly what was considered an “A” or “B” vehicle, and how many were held at the divisional, corps and army level. Within the British Army, all combat vehicles were classified as “A” vehicles, while non-combat soft-skinned vehicles were classified as “B” vehicles.

Never wanting for an acceptable level of vehicles and heavy weapons systems allowed Canadian units to remain combat effective for the vast majority of the time during 1944-1945. In contrast to German forces, new and repaired vehicles and weapons systems reached front-line artillery, armoured and infantry units at a much faster rate and in larger quantities. The Corps of Royal Canadian Electrical and Mechanical Engineers (RCEME) epitomized this contrast in organizational structure and performance as they were largely separated from the combat arms units they serviced past the second line of maintenance, making them much more effective. This article will discuss the process of delivering new and repaired vehicles and weaponry first, including a description of the specialist organizations involved. This will be followed by an outline of the RCEME recovery and repair system, its evolution as an organization and its performance in the field.

Critical secondary sources analyzing the process of repairing and replacing vehicles and major weapons systems within the late war Canadian Army are virtually non-existent. The author has tried to partly fill this gap with a previous article entitled “Destroying the Panthers: The Effect of Allied Combat Action on I./SS Panzer Regiment 12 in Normandy, 1944”, which in part compares Canadian replacement and recovery techniques with those of the German *Panzerwaffe*, or tank arm.² In this article the significance of efficient recovery and replacement techniques within Canadian armoured formations was highlighted as vital to those unit’s operation and combat capability. While other works exist on the repair and maintenance of German armoured vehicles, writing on maintaining and replacing Allied vehicles or major weapons systems mainly consists of official histories and small details within larger areas of operational research. There are two exceptions, focused on American and Soviet forces. The first is Belton Y. Cooper’s *Death Traps: The Survival of an American Armoured Division in WWII*.³ Written by a Combat Command Ordnance Officer and published in 1998, this is a first-hand account of the staggering tank losses encountered by the

² Arthur Gullachsen, “Destroying the Panthers: The Effect of Allied Combat Action on I./SS Panzer Regiment 12 in Normandy, 1944,” *Canadian Military History*, 25, 2, Article 13 (2016): 1-29, <http://scholars.wlu.ca/cmh/vol25/iss2/13> (accessed 10 May 2017).

³ Belton Y. Cooper, *Death Traps: The Survival of an American Armoured Division in WWII* (New York: Presidio Press, 1998).

U.S. Army at the hands of German weapons systems and the effort needed to maintain the strength of U.S. armoured formations. The second is “Tank Repair and the Red Army in WWII” by Gary W. Dickson. Using Russian archival and secondary sources, this article illustrates the importance tank maintenance played in allowing Red Army Tank Corps to maintain their strength in a series of never-ending armoured offensives from 1941-1945⁴

As the larger twin to the personnel replacement organization, the 1st Canadian Echelon within 21st Army Group headquarters dealt with the equipment and weaponry concerns of the First Canadian Army. It must be noted however that Canadian command, control and administration had its limitations. Like all wartime Commonwealth armies, the CAO was dependent on the will and ability of the British government to supply it with large amounts war material.⁵ By late 1943, a majority of Canadian units designated for the 1944 invasion of the continent were properly equipped and training intensively.⁶ As the campaign in Normandy raged in the summer of 1944, the continued stockpiling of large amounts of war material on the continent was not a great challenge. This was due to the Battle of the Atlantic being largely won by late 1943, Allied economies reaching their full production capacities by mid-1944, and the Normandy beachhead being securely established in June of that year.⁷ British political will and ample cooperation with the Canadian government was also present, and this allowed the Canadian military to be equipped and

⁴ Gary A. Dickson, “Tank Repair and the Red Army in World War II”, *The Journal of Slavic Military Studies*, 25, 3 (2012): 381-92, <http://dx.doi.org/10.1080/13518046.2012.705650> (accessed 10 May 2017).

⁵ Canadiansoliders.com, “4th Canadian (Armoured) Division”, <http://www.canadiansoldiers.com/organization/fieldforces/casf/4thdivision.htm> (accessed 14 January, 2016); Charles Stacey, *The Official History of the Canadian Army in the Second World War. Volume III: The Victory Campaign: The Operations in North West Europe 1944-45* (Ottawa: The Queen’s Printer and Controller of Stationary, 1960), 247-52. As of October 1942, the 4th Canadian Armoured Division only had 255 Universal Bren Gun Carriers with which to train with. It did not receive tanks until later.

⁶ John English, *The Canadian Army in the Normandy Campaign: A Study in the Failure of High Command* (Mechanicsburg, PA: Stackpole Works, 2009), 104.

⁷ Richard Holmes, ed., *The Oxford Companion to Military History* (New York: Oxford University Press, 2001), 105, 655. The decisive convoy battles that broke the back of German submarine arm occurred in mid-1943. The Allies in Normandy were superbly supplied despite storms which damaged their artificial harbours in June 1944. John Ellis, *Brute Force* (London: Andre Deutsch, 1990), 526, Statistical Appendix: Tables 26-63. Allied war production peaked during 1944.



The remains of Sherman tanks and carriers waiting to be broken up at a British vehicle dump in Normandy, 1 August 1944. [© IWM (B 8394)]

re-supplied as needed. As a result, the CAO enjoyed full access to a well-stocked common pool of largely American Lend-Lease and British produced equipment.⁸

The total amount of equipment removed from the strength of combat arms units on the front line because of mechanical failure or enemy action usually amounted to 100 per cent of the unit establishment within several months. The total number of vehicles within a battalion-sized regiment in the Canadian Army was spread between its administrative echelons. These three echelons consisted of the A1 (Fighting) echelon, with everything needed to carry out the combat mission, the A2 Echelon, which had everything needed

⁸ G.W.L. Nicholson, *The Gunners of Canada: The History of the Royal Regiment of Canadian Artillery Volume II: 1919-1945* (Toronto: McClelland and Stewart Ltd, 1972.), 55-58. As an example, on arrival in England all Royal Canadian Artillery (RCA) regiments were completely equipped with British produced equipment in the years 1939-1942.

to immediately resupply the A1 Echelon, and the small B Echelon, which consisted of all supply and stores items not immediately needed and the administrative support elements required to keep a battalion-sized combat grouping functioning. Vehicle attrition in the three echelons within combat arms units was due to excessive use, enemy action and travel over harsh terrain. The highest equipment losses for the Canadian Army in NWE occurred during the three months of the Normandy Campaign. Combat in Normandy was more intense and affected a greater number of combat arms units than subsequent infantry-oriented battles during late 1944 and early 1945 in the Netherlands and the Rhineland. During this time, a greater amount of German heavy weapons and armoured vehicles were present within multiple German panzer divisions, the Canadian Army's primary opponent in the months of June–August 1944. The fighting power of these German formations made a sizeable impact on the monthly totals of Canadian equipment losses. These totals drop off markedly once the campaign in Normandy came to a halt in late August, and are relatively low on average for the remainder of the war, as remaining German armoured forces were mainly engaged to the south against British and U.S. armies.

As an example, of the sixty-one Sherman tanks the 6th Canadian Armoured Regiment (1st Hussars) fielded on D-Day, nearly all were lost to enemy action or mechanical failure by the end of August 1944. The Hussar Sherman tank “Holy Roller”, now a monument in London, Ontario, was the only one to survive in the regiment's possession from D-Day until the end of hostilities.⁹ Enemy action was not often the real threat. Tanks sent away for heavy maintenance would often return with another unit, or not at all, being replaced by a newer variant that was more technologically advanced. The fate of “Holy Roller” was very much the exception rather than the rule.

The administrative system designed to replace all Canadian equipment losses was sophisticated. As illustrated in Chart 1, there were a total of five administrative areas within the First Canadian Army's area of operations. From the front lines to the rear areas, these zones consisted of the divisional administrative area, the corps

⁹ The Family of Captain Proctor Clifford Neil, “Captain Neil's Story ~ Bio & Military Cross Award,” In *Captain Proctor Clifford Neil: Honouring the life and accomplishments of a WWII Hero*, <http://www.captainpcneil.com/holy-roller.html> (accessed 5 July 2016).

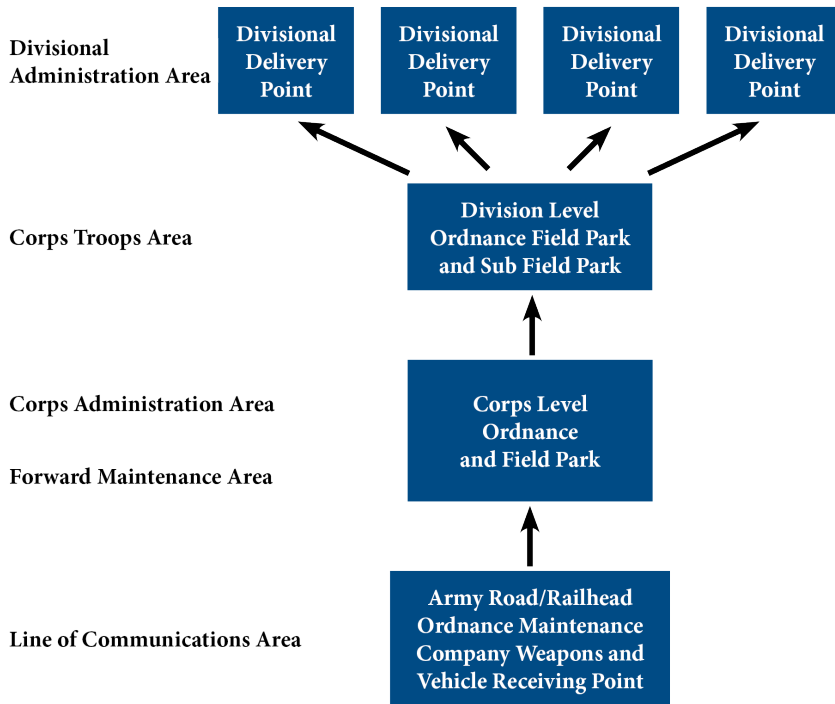


Chart 1: Path of new major weapons systems and "A" & "B" vehicles (excluding heavy armoured fighting vehicles).¹¹

troops area, the corps administrative area, the forward maintenance area and the line of communications area.¹⁰ Canadian 1st Echelon control of major weapons systems and vehicle logistics began with the Canadian Army Ordnance Maintenance Company (OMC), which was actually much larger strength than a company. It consisted of a headquarters, a regulating station section, a stores section, an ammunition section and a tank section. It received all manner of supplies, vehicles and equipment from British-controlled vehicle and ordnance depots located within close transportation distance to the First Canadian Army rail or road head.

¹⁰ John Grodzinski, *Operational Handbook for the First Canadian Army, 1944-45: Formation Organization, Staff Technique and Administration* (Lower Sackville: The Regimental Historian, 1996), 91.

¹¹ Ibid, 92-93.

Rail and road heads were located in the Line of Communications Area and were the logistical start points for the Canadian Army in NWE. There were often multiple First Canadian Army rail and road heads in existence during 1944-1945 as the front moved forward. At these rail and road heads various Royal Canadian Army Service Corps (RCASC) units and numbered supply depots were present. The Canadian Army OMC then distributed what it received from the British Army to Canadian army-level equipment storage locations, fuel and ammunition dumps and vehicle parks. Before anything moved or entered storage, the OMC and road and rail head personnel worked to prepare all war material for these possibilities as required. In a reverse flow, these road and rail heads also received damaged or obsolete equipment that had been removed from the front.¹²

If railroad transport was not available, new vehicles and ordnance was driven forward by second-line transport from the line of communication area depots to the corps-level ordnance field park.¹³ Second-line transport consisted of trucks and other assets operated at the corps and army level; first line being those in the fighting divisions and their formations. There was eventually a total of two ordnance field parks within the First Canadian Army in April 1945.¹⁴ The corps-level ordnance field park would contain everything in order to support a complete army corps, with the exception of rations, water and petroleum products. All forms of heavy and light weapons and quantities of all types of ammunition and spares for all weapon assemblies were present. Smaller stores such as small arms, optics, engineer, signals and workshop equipment were also held. Large parking areas contained row upon row of new and repaired “A” and “B” type vehicles. Only light “A” vehicles were present, the heavier armoured fighting vehicles (AFVs) having their own separate transport and replacement system. On top of all this, quantities of specialist “A” and “B” vehicles (command vehicles, wireless trucks, recovery vehicles and specialist light tracked carriers) were present.¹⁵

This park then fed the forward division-level ordnance field parks and respective armoured or infantry Sub Field Parks. From these

¹² Ibid, 92-93.

¹³ Ibid, 92. Second-line transport was corps and army-level transport, and first-line transport was attached to divisional units.

¹⁴ Charles Stacey, *The Victory Campaign*, 661, Appendix F: Order of battle for all Canadian Army units in NWE.

¹⁵ John Grodzinski, *Operational Handbook*, 92-93.

parks, deliveries were made to further supply points or the items were signed for on a need basis as regimental units required them. For smaller deliverable items that could be pushed forward, these parks supplied divisional Delivery Points (DPS). At these DPS, unit B Echelon (supply and administrative) troops of the combat arms regiments showed up to sign for authorized equipment, vehicles, weapons and supplies on a need basis.

The weapons systems delivered to the Canadian Army OMC that required the largest logistical resources to transport them to the front were heavy armoured fighting vehicles (AFVs). As depicted in Chart 2, these were cut away from the remainder of the logistical process at the OMC and began their own transport path. These vehicles were the major weapons systems of the armoured, armoured reconnaissance, self-propelled field artillery and anti-tank units. Prior to large scale operations, Canadian armoured regiments saw it as imperative to have the number of operational tanks be close as possible to the war establishment tables. The 2nd Canadian Armoured Brigade's strength as of 31 January 1945, immediately prior to February's Operation Veritable, was 214 tanks against a war establishment figure of 226.¹⁶ Units containing armour would report their replacement needs through an AFV or tank state that would be reported on a daily or weekly basis. These daily and weekly returns from the regimental headquarters (RHQ) of each unit were forwarded up the chain of command. For example, an armoured regiment's AFV state would indicate a daily summary of "fitness" for 75mm cruiser tanks (Sherman), 17-pounder (Pr) Fireflies (Sherman Ic or Vc with the longer gun) and 37mm reconnaissance (M3 Stuart) light tanks. "Fit" would refer to an AFV being fully combat operational. As of 1 November 1944, the 4th Canadian Armoured Division fielded 247 "fit" tanks of all makes and seventy-nine "fit" scout cars.¹⁷ For RCA field artillery and anti-tank units, self-propelled (SP) M-10 tank destroyers and SP Sexton howitzers would be reported as part of their

¹⁶ LAC, RG 24 Volume 10,553. 21st AG. A & B Canadian Vehicle Position Report. File 215A21.085 (D1). 31 January 1945 return.

¹⁷ LAC, RG 24 Volume 13,793. 4th Canadian Armoured Division A & Q War Diary November, 1944. T-10550. Return on AFVs within the division, 1 November, 1944.

gun state.¹⁸ At the armoured brigade level the combined states of all armoured regiments would be forwarded to higher command from the brigade headquarters. If an armoured unit was short tanks in any of its troops or squadrons, it would be tasked to receive new AFVs at a certain date. These repaired or new replacement tanks would be driven to the front, transported by low-bed trailer or loaded onto rail cars and then received at the B Echelon of the receiving regiment.

The key component of the replacement process for armour was the 25th Canadian Armoured Delivery Regiment (25th CADR). This regiment was divided into a total of eight functioning squadrons, titled A through H.¹⁹ The 25th CADR squadrons in NWE operated a sophisticated and efficient system for supplying new and repaired AFVs to all Canadian Army units that operated them. They also supplied British, Polish and Czech units operating within the Second British Army and First Canadian Army. The first 25th CADR squadrons to land in France during June-July 1944 were initially under the command of the 1st British Corps. These were then incorporated into the 2nd Canadian Corps and the First Canadian Army after both became operational in mid-July and early August 1944. "C" Squadron landed in Normandy on 7 June 1944 and immediately began transferring tanks to the three armoured regiments of the 2nd Canadian Armoured Brigade.²¹ On 10 July 1944, "E" Squadron

¹⁸ LAC, RG24 Volume 10,670. Equipment State Canadian Army Monthly Report. File 215C1.083 (D6). The final report at the Army level was the above monthly returns of all controlled stores, such as 25-pounder Howitzers and 17-pound anti-tank guns on a divisional basis.

¹⁹ LAC, RG24 Volume 14,276. C Squadron, 25th Canadian Armoured Delivery Regiment War Diary June 1944. T-12748. The 25th CADR squadron war diaries are very detailed regarding actual deliveries of tanks to the units. The only caveat is that often there are discrepancies between the numbers reported being delivered to a regiment and the receiving regiment's strength increase. This was largely due to breakdowns in transit, delays in reporting and tanks being sent back to delivery squadron to correct kit deficiencies. It was also noted in the course of this research that early in the campaign due to a shortage of AFVs there was some "borrowing" between armoured regiments. Also, when a regiment was in action they often did not have time to report their strengths and losses. It would take a day or two afterwards for all tanks and crews to be accounted for.

²⁰ LAC, RG24 Volume 10,663. Chart 2: First Canadian Army Plans Diagram of AFV "A" vehicle Recovery, Repair and Replacement. File 215C1.045 (D12). John Grodzinski, *Operational Handbook*, 93.

²¹ Leonard Curchin, *The Elgins: A Regimental History* (St. Thomas: The Sutherland Press, 1977), 78. These regiments had suffered large losses in the period of fighting 6-7 June 1944.

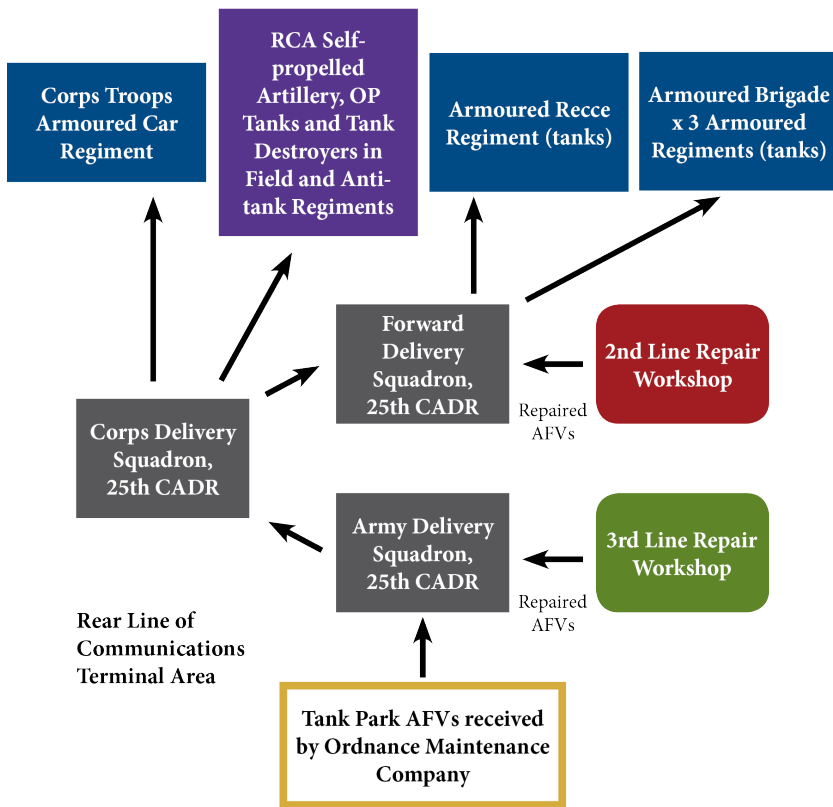


Chart 2: First Canadian Army system of armoured fighting vehicle (AFV) replacement: Paths of new/repared AFVs to combat arms regiments.²⁰

arrived within the beachhead. This squadron was responsible for tank deliveries at the 2nd Canadian Corps level. These two squadrons were followed by “F” Squadron landing on 23 July 1944. This squadron was to aid in railhead acceptance of AFVs and be responsible for delivery of vehicles at the First Canadian Army level once the army became operational. In this role, it was also the squadron responsible for sending tanks to British, Czech and Polish armoured units under First Canadian Army command. “D” Squadron of the 25th CADR



Sherman tanks and other vehicles under repair at a REME depot, 3 July 1944. [© IWM (B 6328)]

landed on 26 July 1944, and was responsible for all units within the 4th Canadian Armoured Brigade.²²

British stocks of replacement AFVs were delivered to large vehicle depots on the continent near road heads and rail heads by transport units of the British Army. The Canadian Army receiving procedure to accept these vehicles into service was quite comprehensive. Working together in tandem during this process from August 1944 onward was the OMC's Royal Canadian Ordnance Corps (RCOC) Tank Railhead Section and the 25th CADR's "F" squadron. These two groups would receive a shipment of AFVs from the British Army's Vehicle Company, Army Ordnance Delivery organization. Once they

²² Ibid, 78. Once D Squadron disembarked it immediately turned over twenty-two tanks with full crews to 4th Canadian Armoured Brigade to cover losses suffered 9-10 August 1944.

had arrived, the new AFVs would have their documents examined and kit removed and re-checked at the “F” Squadron tank park. Next, the armament would be degreased and a general cleaning of the fighting compartment would take place. After this, the sprockets, road wheels and tracks would be adjusted and repaired as required. Following this, a general servicing of weapons, radios, and the power traverse would occur. Any modifications needed would be completed by the Canadian Army’s 3rd Canadian AFV Support Unit and the 4th Canadian Armoured Troops (third-line Maintenance) Workshop, working alongside “F” Squadron. Once this was concluded, optics, radios and fragile equipment would be installed or boxed for transport. Next, all onboard stowage of ammunition would be completed in accordance with authorized tables. Finally, the Light Aid Detachment (LAD) attached to “F” Squadron would then re-certify all the AFVs to make sure they were mechanically fit. Once this was completed, the tanks were ready to be sent out.²³ If “fit” tanks were not issued right away, they would be maintained by 25th CADR personnel in the “F” Squadron tank park.

Once an order was received for tanks to be sent forward, the appropriate number would then be driven, transported by rail or loaded onto tank transporters for the trip from “F” Squadron to the 25th CADR corps delivery squadron.²⁴ This squadron would then feed the two forward delivery squadrons of the 25th CADR present in NWE in August 1944. Within their operating bases, 25th CADR squadrons operated “tank circuits”, with each stop in the circuit checking over an area of the tank. This repetitive inspection and receiving process at each squadron could take time. While of questionable efficiency, it was effective at resolving issues vehicles had arrived with and prevented these problems from reaching armoured regiments in the field. At any point repaired vehicles which had come from RCEME facilities could join a 25th CADR squadron.

²³ LAC, RG 24 Volume 14,279. F Squadron, 25th Canadian Armoured Delivery Squadron War Diary, October 1944. On 2 October 1944, several Kangaroo armoured personnel carriers slated for delivery to the 1st Canadian Armoured Personnel Carrier Regiment by “F” Squadron, 25th CADR, were instead re-routed back to Royal Canadian Corps of Electrical and Mechanical Engineers (RCEME) maintenance units due to mechanical issues.

²⁴ LAC, RG24 Volume 10,457. Tank Replaces and Releases. File 212C1.1009 (D28). Chart detailing the actions of a rear delivery squadron of the 25th Canadian Armoured Delivery Regiment.

In order to meet demands for new AFVs quickly, 25th CADR squadrons usually had an AFV “float” or balance that they could draw from, similar to the Canadian Army personnel reinforcement Canadian Base Reinforcement Group (CBRG) units. This float was a percentage of the total AFVs in service with the front-line units that a 25th CADR squadron was designated to support. Though this percentage went up and down with supply and demand, there was always an effort made to maintain the desired inventory level to deal with emergencies. This allowed the 25th CADR to be able to respond very quickly to a recipient unit’s requests for large reinforcements. The best example of this rapid response capability is the 10 August 1944 delivery by “D” Squadron, 25th CADR of twenty-two fully-crewed Sherman tanks to the 28th Canadian Armoured Regiment.²⁵ This regiment had lost forty-four Shermans, two Stuarts, one Crusader anti-aircraft tank and one scout car totally destroyed in battle on 9 August 1944.²⁶ This immediate resupply, plus four tanks the regiment had as a reserve Left Out of Battle (LOB) contingent, gave it a total reinforcement of twenty-six new tanks. This number would theoretically make it capable of immediate combat operations. On 12 August 1944, a further sixteen tanks were delivered, bringing up the regiment’s new tank deliveries to thirty-eight for the period 10-12 August 1944.²⁷ The number of tanks delivered in this example and the speed in which they arrived is very impressive.

The process of AFV replacement and repair within an average Canadian armoured regiment over an eighteen-day period during August 1944 is depicted in Chart 3. In these two and half weeks, the 27th Canadian Armoured Regiment lost a significant number of vehicles due to enemy action and mechanical failure. It had participated in Operations Totalize, Tractable and the initial battles of the Falaise Pocket. Though significantly weakened, after the delivery of new and repaired vehicles, the regiment fielded thirty-eight “fit” tanks on 18 August. With an additional two tanks in

²⁵ LAC, RG 24 Volume 14,277. D Squadron, 25th Canadian Armoured Delivery Regiment War Diary August 1944. T-12748. 9 August 1944 entry.

²⁶ LAC, RG24 Volume 14,292. 28th Canadian Armoured Regiment War Diary August 1944. T-12764. War Diary entry for 9 August 1944 notes the one-day loss on Hill 140 of forty-four Shermans, two Stuarts, one Crusader anti-aircraft tank and one scout car.

²⁷ LAC, RG 24 Volume 14,277. D Squadron, 25th Canadian Armoured Delivery Regiment War Diary August 1944. T-12748. 12 August 1944 entry.

the regimental LAD repairable within two days, forty would be “fit” by 20 August. Though not perfect, this was enough to theoretically field three squadrons of four troops. Each troop could field three tanks each, plus four for the headquarters squadron. Other regiments involved in heavy combat also received large numbers of replacement tanks in short order. The 25th CADR took an incredibly short time to become operational on the continent in the wake of D-Day. For example, to replace the D-Day amphibious assault losses inflicted on the 1st Hussars (6th Canadian Armoured Regiment), twenty new or repaired tanks were delivered on 10 June 1944.²⁸

Within the German Army, tank losses due to combat and mechanical failure were not replaced as efficiently as within the Canadian Army. As an example, the second battalion of the German Panzer Lehr Regiment 130 in Normandy was sent only eleven replacement Panzer IV tanks on 8 July 1944, having received none in June.²⁹ As illustrated in Chart 4, the effects of combat, mechanical failure and battle damage on the battalion’s strength in the period 1-26 June 1944 were severe. Repairs were also slow, as they occurred within the panzer units rather than in specialized separate repair units. As of 26 June, there were forty-seven Panzer IVs in short and long-term repair near the chaos of the front lines. Over the course of the campaign in NWE, the 25th CADR was successful at re-supplying all Canadian units operating heavy AFVs. This was due to large levels of production from repair workshops and 25th CADR forward delivery squadrons being able to maintain large “floats”. As an example, “D” Squadron, 25th CADR delivered a total of 295 new and repaired AFVs to the 4th Canadian Armoured Division during the month of October 1944.³² This was enough to nearly re-equip the entire division. As illustrated in Charts 5 and 6, Canadian armoured regiments maintained their strength while opposing German units withered. It also certainly helped that Allied forces in NWE during 1944-1945

²⁸ Michael McNorgan, *The Gallant Hussars: A History of the 1st Hussars Regiment 1856-2004* (Alymer, ON: The Alymer Express, 2004), 132.

²⁹ Niklas Zetterling, *Normandy 1944: German Military Organization, Combat Power and Organizational Effectiveness* (Winnipeg: J.J. Fedorowicz, 2000), 386.

³⁰ LAC, RG 24 Volume 14,287. 27th Canadian Armoured Regiment tank state report. File 1044.

³¹ Niklas Zetterling, *Normandy 1944*, 390.

³² LAC, RG 24 Volume 14,278. D Squadron, 25th Canadian Armoured Delivery Regiment War Diary October 1944. T-12748.

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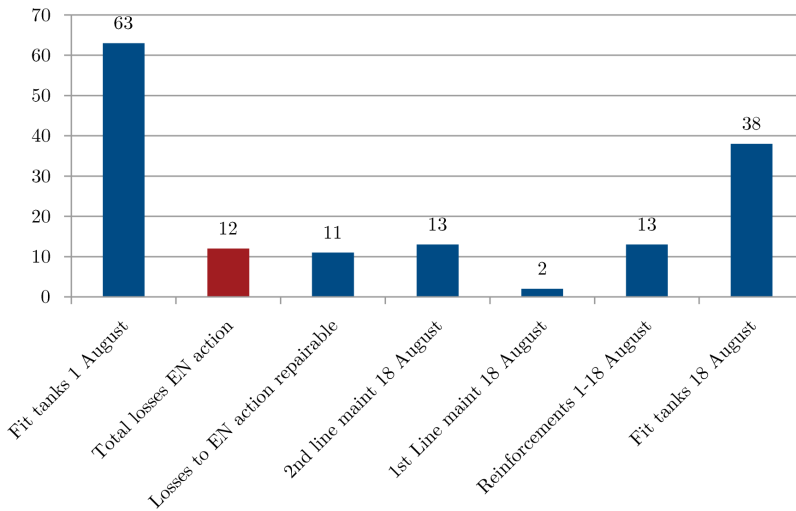


Chart 3: 27th Canadian Armoured Regiment Sherman 75 mm and Firefly 17-pounder (Pr) losses, replacements and "fit" status 1-18 August 1944.³⁰

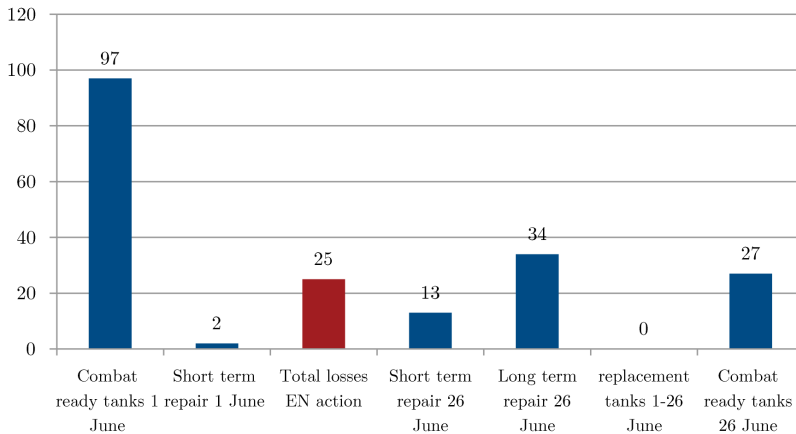


Chart 4: German II./Panzer Lehr Regiment 130's Panzer IV tank strength returns and losses due enemy action and mechanical failure 1-26 June 1944.³¹

possessed total air superiority, had large amounts of replacement equipment and vehicle movement, and recovery was unimpeded.

The delivery of non-AFV major weapons systems and other equipment did not utilize any special delivery squadrons to transport

it to a fighting unit. Once past army-level ordnance parks, it was deposited or driven to corps-level ordnance field parks by second-line transport. From these locations, it was then moved to the divisional-level field parks. At the division level, there was a divisional ordnance field park and a corresponding armoured or infantry ordnance sub-park. One of each was allocated to each Canadian armoured or infantry division.³³ The field parks were numbered by the division number, and the sub-parks were numbered 201-205. For example, the 5th Canadian Armoured Division's ordnance depots consisted of the 5th Canadian Armoured Division Ordnance Field Park and the 205th Canadian Armoured Ordnance Sub-Park.³⁴ In these large parks, all manner of equipment, vehicles and stores were located in a manner similar to the corps level parks. From these points, divisional units would be authorized on a need basis to help themselves in order to retain their wartime establishments.

RCA field artillery, anti-tank and light anti-aircraft regiments reported their status in a very similar manner as the armoured units. For artillery regiments, the guns were their primary piece of equipment and the number of operational guns and those under repair was constantly monitored. A gun state of ordnance holdings accompanied by an ammunition usage report was forwarded each day by an artillery regiment's RHQ to higher RCA command. These returns were very important, as their data was used to calculate supply requirements and to gauge ammunition usage.³⁵ The returns would make their way up the chain of command, and army-level field ordnance parks would then authorize the release of new equipment to make up for combat and mechanical losses. New replacement artillery equipment was held by army group-level British Army ordnance field parks. The Canadian army-level ordnance park would then receive new equipment from the OMC and move it to the corps-level ordnance

³³ Charles Stacey, *The Victory Campaign*, 661, Appendix F: Order of Battle for Canadian Units in NWE.

³⁴ Charles Stacey, *The Victory Campaign*, 661, Appendix F: Order of Battle for Canadian Units in NWE.

³⁵ LAC, RG 24 Volume 13,661. First Canadian Army A & Q War Diary December 1944. T-7093. Ammunition usage and receipts return. 1st British Corps and 2nd Canadian Corps, 16 December 1944. The guns state was also needed in order to arrange for the supply of the required amount of ammunition that was needed to keep it combat capable. Continuous delivery was needed for regular operations and extra on an irregular basis for larger operations.

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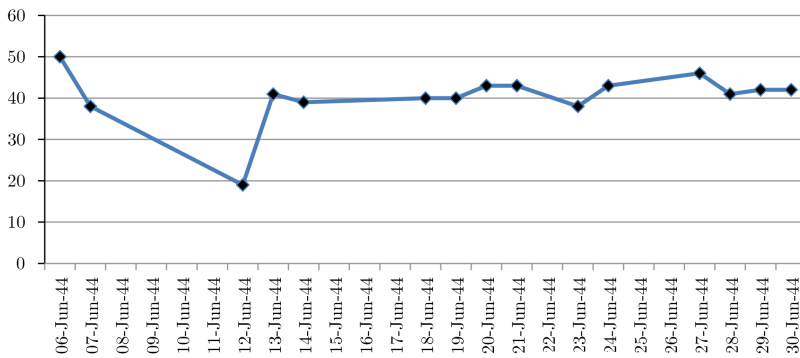


Chart 5: Operational tank strength of 6th Canadian Armoured Regiment's Sherman tanks June 1944. War establishment = 50 Shermans.³⁶

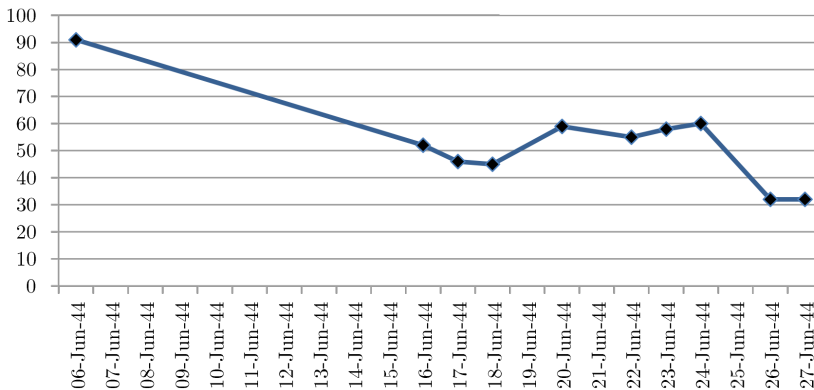


Chart 6: Operational tank strength of the German II./ss Panzer Regiment 12's Panzer IV tanks, June 1944. War establishment = 101 Pz IVs.³⁷

field parks. Repaired and reconditioned equipment would also be

³⁶ Roman J. Jarymowycz, "The Quest for Operational Maneuver in the Normandy Campaign: Simonds and Montgomery Attempt the Armoured Breakout" (PhD diss., McGill University, 1997), 336, Appendix E: Strength returns for the 2nd Canadian Armoured Brigade in June 1944. Because of the quick practice of back-loading tanks with any problems past the abilities of the light aid detachment, all these Shermans must be considered operational.

³⁷ Norbert Szamverber, *Waffen SS Armour in Normandy: The Combat History of SS-Panzer Regiment 12 and SS-Panzerjager Abteilung 12 Normandy 1944 based on their original war diaries* (Solihull, England: Helion and Company, 2012), 234, Appendix VII: Tank strength of SS-Panzer Regiment 12 1 June-11 August 1944.



1st Canadian Armoured Brigade Firefly and Sherman Ib 105mm Sherman in the Hague, Netherlands, May 1945. [© Ary Koppejan / Nederlands Fotomuseum]

transported by RCME personnel to the division field ordnance parks and sub-parks, where it would be taken on strength (TOS).

The divisional ordnance parks would contain everything in the way of new and repaired towed artillery pieces, replacement artillery vehicles and radios. While all artillery equipment and weaponry was very sophisticated, maintaining and operating it was less complicated than an AFV with its motor, running gear, transmission, power turret traverse, sights and radios. Compared to a 17-Pounder anti-tank gun, a Firefly tank was much more challenging from a maintenance and delivery perspective, hence the lack of a 25th CADR-type organization exclusively for artillery regiments. The approach to maintaining sophisticated artillery systems in 1944-1945 was very similar to that for an “A” or “B” vehicle. The successive “lines” within the RCME repair system could handle increasingly difficult artillery repairs.

Guns constantly required maintenance, but this could largely be completed at the regimental level by the LAD. If a gun was worn out or damaged, it could be easily replaced. A new one would be picked up at the field ordnance or sub-parks by a gun crew with an artillery tractor or tower. New or repaired guns were drawn as needed to replace weapons under repair or that were lost in battle. An example of a mass draw of new equipment occurred in early August 1944. All three RCA field regiments within the 3rd Canadian Infantry Division drew an entirely new complement of seventy-two towed 25-Pounder howitzers, turning in their old 105mm Priest self-propelled guns.³⁸

In NWE during 1944-1945 there were many heavy AFVs operated by non-Canadian Armoured Corps (CAC) regiments within the Canadian Army. These were mainly artillery observation post (OP) tanks, self-propelled artillery, tank destroyers and artillery towers operated by RCA units. These vehicles were delivered by the 25th CADR in exactly the same manner as a Sherman Firefly tank was delivered to an armoured regiment. Universal Carriers, T-16 and M-14 gun tractors were also "A" vehicles, but the delivery of these smaller vehicles was accomplished via tank transporters due to their low weight and small size.

In contrast to the German Army during 1944-1945, the Canadian Army was totally mechanized in all areas that required soft-skinned "B" vehicles. This very large motor pool was one of First Canadian Army's greatest strengths. It allowed Canadian forces to be very mobile and carry out all logistic tasks, increasing their military effectiveness. As opposed to occasional A combat vehicle shortages, there was never a shortage of soft-skinned transport in Canadian units. The 31 August 1944 "B" vehicle return for the 2nd Canadian Infantry Division shows 125 General Service 3-ton lorries on strength as opposed to its war establishment number of 104, making it significantly over-strength.³⁹ In comparison, the German 12th SS Panzer Division as of 1 June 1944 had only 65 per cent of its

³⁸ LAC, RG 24 Volume 14,472. 14th Field Regiment, RCA War Diary August 1944. T-16371. 7 August 1944. The British field ordnance park in question for this exchange was designated a "Royal Artillery re-organization centre".

³⁹ LAC, RG 24 Volume 10,553. 21st AG. A & B Canadian Vehicle Position Report. File 215A21.085 (D1). 31 August 1944 return. "B" vehicle state for the 2nd Canadian Infantry Division as of 31 August 1944.



REME troops with their Diamond T 969A Wrecker working on a disabled Universal Carrier in the centre of Cahagnes, 2 August 1944. Canadian crews would have looked very much like these. [© IWM (B 8498)]

authorized number of trucks operational, and only 33 per cent of its gun tractors.⁴⁰

Unsophisticated general service (GS) vehicles could be used in multiple roles by virtually any type of unit. Some examples of GS “B” vehicles within the Canadian Army were 3-ton lorries and jeeps. Many were produced in the United Kingdom (U.K.) with a right-hand drive, while others were of North American manufacture. Not being AFVs, they could only sustain low amounts of damage and had a limited capability to mount weapons. More specialist Canadian Army “B” vehicles, such as petrol tankers and command caravans, came with assigned drivers to operate them. Documentation for these vehicles had to follow the vehicle from point to point, and their employment and status was monitored constantly.

As shown in Chart 7, the British 21st Army Group vehicle depots would release “B” vehicles as authorized by 2nd Canadian Corps and later First Canadian Army headquarters. Released “B” vehicles would travel directly to either to the Canadian corps-level ordnance

⁴⁰ Russell Hart, *Clash of Arms: How the Allies Won in Normandy* (Boulder, CO: Lynne Reimer Publishing, 2001), 225. This state of affairs reduced the mobility of the division in Normandy drastically.

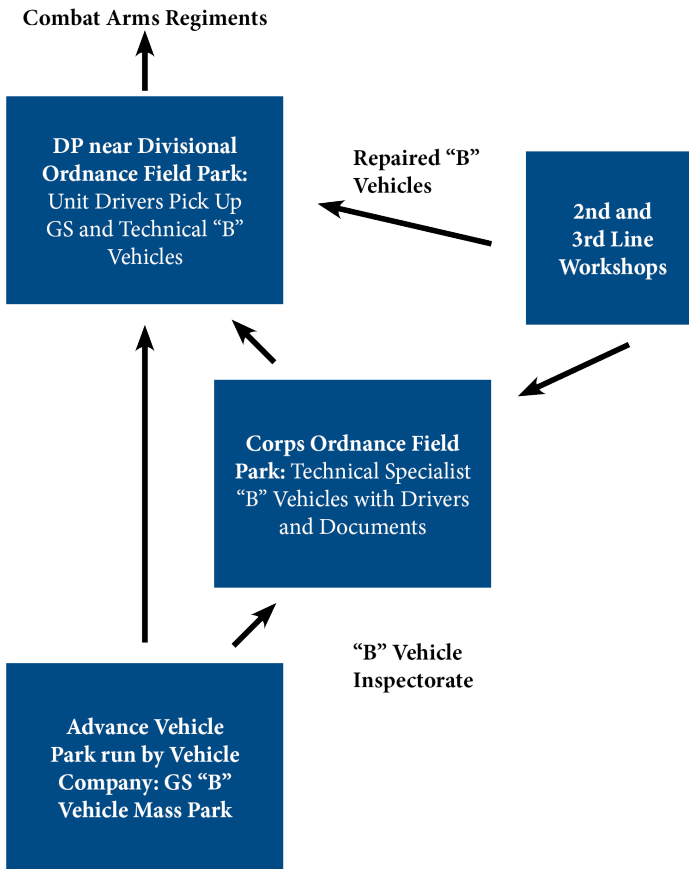


Chart 7: First Canadian Army vehicle path chart for "B" vehicle replacement.⁴¹

field park or a delivery point near the division-level ordnance field park. Unit drivers would sign for the new vehicles on a need basis at the DP near the divisional ordnance field park. GS category "B" vehicles that were repaired by RCEME maintenance units would also go directly to the DPs near the divisional ordnance field park, where they would also be picked up by unit drivers. New and repaired

⁴¹ LAC, RG24 Volume 10,663. First Canadian Army Plans Diagram of "B" vehicle delivery/replacement. File 215C1.045 (D12); John Grodzinski, *Operational Handbook*, 93, Appendix D: Canadian Army System of Supply of Ordnance Stores in the Field Chart 1944.

specialized vehicles such as wreckers, radio vehicles and ambulances would be assembled at the corps-level ordnance field park. From this point, these specialist vehicles could be dispersed to unit DPS, but only with the proper documentation and the assigned driver. Only 2.5 per cent of the respective corps total unit holdings of various technical vehicles would be held in divisional field ordnance parks and DPS as replacements.

The Canadian Army's recovery and repair system for maintaining its inventories of vehicles, weapons and equipment during the campaign in NWE was maintained by units of RCEME. Its creation and the repair and recovery systems utilized by its units were directly influenced by the introduction of the British Army equivalent, The Corps of Royal Electrical and Mechanical Engineers (REME), which officially came into being in October 1942. In October 1941, the British Beveridge Report had identified the need to properly employ large numbers of skilled tradesmen, engineers and technicians which had hurriedly been put into uniform in the mobilization of 1939.⁴² This recruitment had stripped a section of British industry that desperately needed their skills. At the same time, these personnel were not being correctly employed within the military to utilize their capabilities. It was deemed necessary to release some of these some personnel for civilian wartime production and re-enroll those still needed within the British Army to utilise their technical expertise for maintenance duties.

The subsequent British Sinclair-Weeks-Dunkly Report of February 1942 went further to recommend the creation of a new corps of electrical and mechanical engineers. This corps would mainly affect British Royal Ordnance Corps (ROC) engineering personnel then currently responsible for repair, recovery and replacement duties. After royal assent, this corps became REME and it was officially incorporated into the British Army in the fall of that year.⁴³ New processes came into effect simultaneously to allow the recovery and repair of all British Army vehicles, weapons and equipment in the shortest amount of time.

⁴² Murray Johnston, *Canada's Craftsmen at 50: the Story of Electrical and Mechanical Engineering in the Canadian Armed Forces*, electronic edition (Borden, ON: The Guild of the Electrical and Mechanical Engineering Branch Charitable Trust, 2008), 267.

⁴³ Ibid, 268.

In May 1942, the commander of the CAO, Lieutenant-General Andrew McNaughton, pointed out the importance of keeping CAO systems for recovery, repair and maintenance as similar as possible to the British while minimizing organizational change. As a result, British REME processes were officially introduced into the Canadian Army as of January 1943, but personnel affected by these processes remained in the RCOC. Despite two-thirds of all RCOC personnel by 1942 being involved in maintenance or other engineering roles (E Branch) rather than logistic stores roles, resistance to the creation of a new corps was prevalent within the upper levels of RCOC leadership, made up of senior (O Branch) stores officers. While still not having created a new corps, by the time Canadian forces participated in the Sicilian Campaign in the summer of 1943, British REME processes had been fully adopted. Overworked divisional workshops had been reorganized into multiple brigade workshops and regimental level LADs within participating Canadian formations.⁴⁴

Due to pressure from on-loan REME British officers within CMHQ and public debate within the parliament in Ottawa spurred on by the civilian Canadian Engineering Institute and its publications, discussion within the CAO regarding the creation of a separate corps regained strength in the spring and summer of 1943.⁴⁵ Further meetings within CMHQ over operational planning details of Operation Overlord, the invasion of France, acknowledged the need for a separate mechanical engineering corps within the CAO. Official organizational change that created the Canadian Corps of Electrical and Mechanical Engineers (CEME) finally came into effect on 1 February 1944, one year and six months after the official incorporation of REME into the British Army. With royal assent, CEME became RCEME on 2 April 1944, just in time for the Normandy invasion.⁴⁶ With this act, virtually the entire “E” Branch of the RCOC were rebadged to become the first members of RCEME. This final transformation put the final administrative and command touches on the maintenance process evolution within the fully mechanized CAO. It was now more capable than ever of keeping

⁴⁴ Murray Johnston, *Canada's Craftsmen: The Story of the Corps of Royal Canadian Electrical and Mechanical Engineers and of the Land Ordnance Engineering Branch* (Ottawa: RCEME Corps History, 1983), 167.

⁴⁵ R.H. Hodgson, Doug Knight (Editor), *The RCEME History Series Volume 1: The Formation of the Corps of Royal Canadian Electrical and Mechanical Engineers*, electronic version (Ottawa, ON: The RCEME Corps Fund, 2016), 21.

⁴⁶ Murray Johnston, *Canada's Craftsmen at 50*, 269.

a major percentage of CAO vehicles and major weapons systems operational. The creation of an entirely new army corps and adoption of new repair and recovery processes were significant mileposts in the evolution of the Canadian Army during the Second World War. Overcoming extreme institutional resistance, former RCOC “E” Branch officers had finally prevailed to make the CAO significantly more operationally effective.

When conducting operations, the CAO’s recovery and repair system was divided into levels so that no one area was overstressed by its workload. If there was an over load at one level, or the task was too complicated, it would be passed to the next successive level, commonly designated as a “line”. As illustrated in Charts 8 and 9, RCME had a total of four “lines” of maintenance to repair mechanical faults or battle damage. First-line was the organic repair services attached to the combat arms regiments. Further lines (levels) after this took on successively more difficult and complicated repair and rebuilding assignments. The majority of the work in the RCME workshops and LADS was done prior to or after combat operations. Enemy action was responsible for only a very small percentage of second-line workshop’s tasks. Their workload was divided as follows: over 95 per cent of jobs related to mechanical breakdowns, 2 per cent stemmed from battle damage and 3 per cent involved road accidents.⁴⁷ Each successive line took on more difficult jobs that required more repair hours, more replacement parts, other specialized tools and more specialized tradesmen to accomplish. Items that were dealt with by the first or second lines of maintenance were the easier jobs that could be done quickly. This allowed maximum resources to be deployed into repairing and making operational the maximum number of vehicles in the shortest amount of time. For example, a vehicle or weapon repair job that would take more than four hours was immediately back-loaded out of a LAD’s area of operations. Secondly, on occasions during a rapid advance, the main body of a brigade-level RCME workshop could be split into two sections if necessary, establishing rear or forward advanced workshop detachments (AWD and RWD). These were non-standard special teams detached from the workshop to meet a particular temporary need. It could be made as large or small as the tactical situation demanded. These teams were tasked with providing advanced recovery and repair services in cooperation

⁴⁷ Ibid, 42.

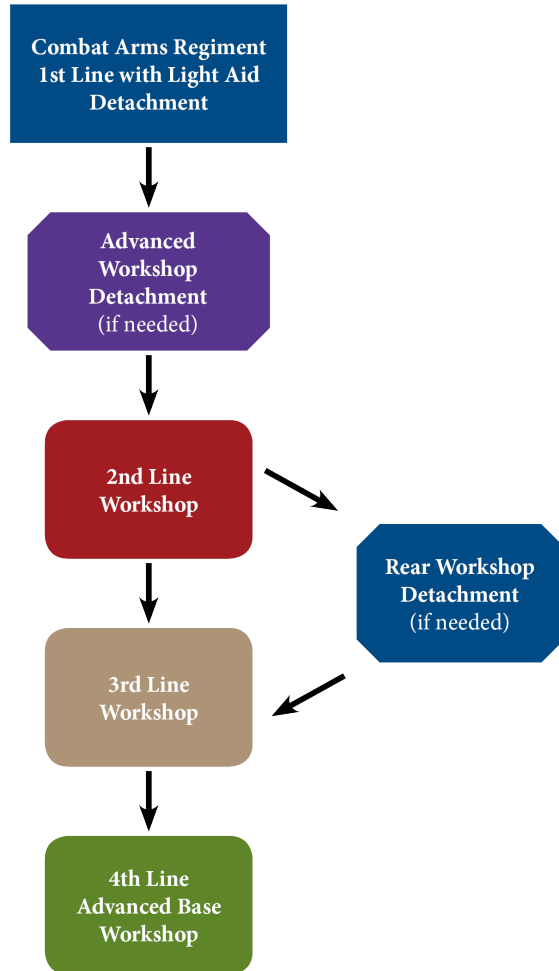


Chart 8: First Canadian Army lines of maintenance for the recovery and repair of “A” and “B” vehicles and major weapons systems.⁴⁸

with RCEME first-line maintenance LADS at the regimental level or remaining behind a brigade workshop’s main body as it advanced. If needed, the AWD could act as the link between the first and second lines of maintenance, these two lines taking the lion’s share of repair, recovery and maintenance duties.⁴⁹

⁴⁸ Ibid, 42-44.

⁴⁹ Ibid, 42.

The first-line maintenance capability within the combat arms regiments consisted of the LAD workshops. One was attached to each RCA and CAC regiment, the infantry LADS held at the brigade level. For example, the 2nd Canadian Armoured Brigade's three regiments had the following LADS, each manned by RCEME troops:⁵⁰ the 6th Canadian Armoured Regiment contained the No. 54 LAD, the 10th Canadian Armoured Regiment was assigned the No. 55 LAD and the 27th Canadian Armoured Regiment was issued the No. 85 LAD.

These small light detachments were designed to be extremely mobile and had a minimum number of personnel, vehicles and equipment. They dealt with easily correctable problems that AFV and gun crews could aid in resolving within a certain time limit. They put maximum effort into these easier problems and "back-loaded" (sent to the rear) what could not be handled quickly or was beyond their capabilities. The main duties of the LAD were light welding, mechanical repairs and assisting in maintenance questions. They were spread evenly throughout the regimental administrative (A1, A2, B) echelons of the regiment they were assigned to. Though they contained limited capabilities, the LADS could work very hard in cooperation with the crews to make a large number of small repairs in a very short period of time. As an example, No. 54 LAD of the 1st Hussars (6th Canadian Armoured Regiment) made a titanic effort to repair tanks in the aftermath of the disastrous 11 June battle at Le Mesnil-Patry, where heavy losses were suffered.⁵¹

AFVS, vehicles, and ordnance back-loaded by a regimental LAD for second or third-line maintenance would be collected by its respective brigade workshops' recovery platoon assets and back-loaded to the brigade collection point. This collection point was within the workshop's base of operations or very near to it. It also worked closely with the three regiments of each brigade, but also with divisional troops, such as the field artillery, machine gun and anti-tank regiments. The LAD's from these divisional units would be designated to feed a certain brigade workshop in exactly the same manner as one of the armoured or infantry brigade's regimental LADS. There was no major difference between the duties of an armoured or infantry brigade workshop.

⁵⁰ Ibid, 327, Appendix 5.

⁵¹ LAC, RG 24 Volume 14,213. 6th Canadian Armoured Regiment (1st Hussars) War Diary June 1944. Reference was made on this date to a large effort made by No. 54 LAD to repair a significant number of damaged tanks.



The crew of a Sherman tank of the Westminster Dragoons (2nd County of London Yeomanry) repairing damage to one of its suspension units caused by an 88mm anti-tank shell, 7 June 1944 caption. Canadian tank crews would have repaired mine damage in this manner.
[© IWM (B 5423)]

For an infantry brigade, its brigade workshop would collect, repair or back-load all infantry AFVs, vehicles and ordnance in exactly the same manner as the armoured brigade workshop.

Canadian Army second-line RCEME repair assets consisted of the main body of the brigade workshop. As an example, the 2nd Canadian Armoured Brigade had the 2nd Armoured Brigade Workshop assigned to it. Despite the misnomer, the brigade workshop operated in what was considered a divisional-level repair area if the workshop in question was part of an infantry or armoured division. The second-line brigade workshop's main bodies in armoured or infantry divisions were to be located no more than two hours from the location of the LAD. These main bodies were not very mobile, and



REME troops work to repair the track on a Sherman tank in heavy rain, near Geilenkirchen, Germany, 25 November 1944. [© IWM (B 12087)]

had trouble keeping up with the rapid advances of First Canadian Army in August and September 1944.

This was especially the case with workshops operating within the 4th Canadian Armoured Division. In response, its brigade workshops from September 1944 onwards began to be sited very near the front. In this case, the need for an AWD special team was removed and the main body of the brigade workshop took on its role. If needed a RWD would remain far to the rear with less mobile elements, totally reversing the standard procedure. The three infantry brigade workshops within the two Canadian infantry divisions in NWE after August 1944 also struggled to remain close to the moving front lines. To mitigate the distances one workshop's entire main body was always located forward, the other two located further to the rear or

in transit.⁵² Also within the second-line maintenance structure was the 2nd Canadian Corps Troops Workshop. This facility provided repair services for corps-level units. The LADS of corps-level combat units would feed the corps workshop in exactly the same process as the infantry and armoured LADS fed their brigade workshop.

If an AFV or other equipment was sent off strength (sos) as a repair casualty to a second-line maintenance unit, it was taken off the strength of its original regiment. It was now on the strength of the respective RCEME unit, and all further repair work would be completed by RCEME personnel.⁵³ The repair process was quite flexible, and there was no rule that a certain squadron's tank had to return to its respective squadron or regiment. As a new or repaired similar tank emerged from the repair and reinforcement pipeline, it would instead take its place and be delivered by the 25th CADR forward squadron.

Despite the infantry and armoured titles, the armoured and infantry brigade workshops also worked on AFVs and other ordnance that was employed by the RCA field artillery and anti-tank units. Artillery OP tanks, self-propelled howitzers, self-propelled anti-tank guns and artillery towers all broke down and suffered battle damage at the same rate as infantry and armoured unit AFVs. If a RCA artillery AFV was finished repairs, the designated 25th CADR squadron would deliver this vehicle to an RCA unit in exactly the same manner as it would to an armoured unit. As part of its role, the corps-level "E" Squadron, 25th CADR was responsible for delivering tracked artillery "A" vehicles directly to the RCA regiments. The "B", "C", "D" and "G" squadrons of the 25th CADR were responsible for the tank equipped Canadian armoured brigades.⁵⁴

The third line of RCEME maintenance was designated to complete the rebuilding and reconditioning of equipment. This was not a service available within the first and second lines as shown in Chart 9. Rebuilding and reconditioning took a very long period of time and had to be completed in a static factory-like environment. In these

⁵² Ibid, 65.

⁵³ LAC, RG 24 Volume 10,553. A & B Canadian Vehicle Position Report. File 215A21.085 (D1). 21st AG 30 November, 1944-31 January 1945 returns. Divisional vehicles strengths in this time period do often go down, but this is not to enemy action but due to mechanical repairs.

⁵⁴ LAC, RG 24 Volume 14,278. E Squadron, 25th Canadian Armoured Delivery Regiment War Diary December 1944. Multiple entries regarding the delivery of RCA self-propelled artillery pieces and Ram tracked gun tractors (towers) exist.

locations detailed and complicated work could take place out of the way of the elements and enemy action. This was their designated role, but the majority of their work was overflow from second-line maintenance. The corps troops, armoured brigade and infantry brigade workshops could all feed overflow repair cases directly to third-line units. The No. 2 Tank Troops Workshop was an example of a third-line RCEME asset in the summer of 1944. This facility was used as an overflow catch point for overworked second-line brigade workshops.⁵⁵ The third-line maintenance units lacked integral transport, and faced extreme difficulties in remaining at a fixed distance from second-line workshop bases. If one was ordered to move forward, others stayed in place as long as they could to remain effective and take on the moving unit's workload. All third-line maintenance facilities were under the command of the First Canadian Army Deputy Director of Mechanical Engineering (DDME) as of 1 September 1944.⁵⁶

Canadian Army fourth-line maintenance was a capability that existed in the form of the No. 1 and No. 2 Advanced Base Workshops. The No. 1 Canadian Base Workshop, as the parent organization of these fourth-line facilities, remained in the U.K. These organizations were commanded by the Director of Mechanical Engineering (DME), 21st Army Group. These fourth-line assets were designed to be available at the rate of one per Canadian corps. They provided factory-like rebuilding and reconditioning services for vehicles and other major pieces of equipment on a higher level than third line. These groups could also be utilized for special missions in addition to their designated roles. For example, No. 1 Advanced Base Workshop inspected and performed maintenance on over 400 guns prior to Operation Totalize in early August 1944. It also rebuilt and repaired large numbers of submerged vehicles that had been recovered from the Juno and Sword Beach landing areas in Normandy.⁵⁷ If third-line maintenance assets could not handle a job or were overloaded, these two facilities could assist in completing, rebuilding and reconditioning tasks.⁵⁸ Specialized recovery assets in the army-level line of communications area also existed. The RCEME Canadian Army No. 2 and later No. 1 and No. 3 Recovery Companies operated in

⁵⁵ Murray Johnston, *Canada's Craftsmen at 50*, 70-71.

⁵⁶ *Ibid.*, 65.

⁵⁷ *Ibid.*, 74.

⁵⁸ *Ibid.*, 64.

Armoured Division Example

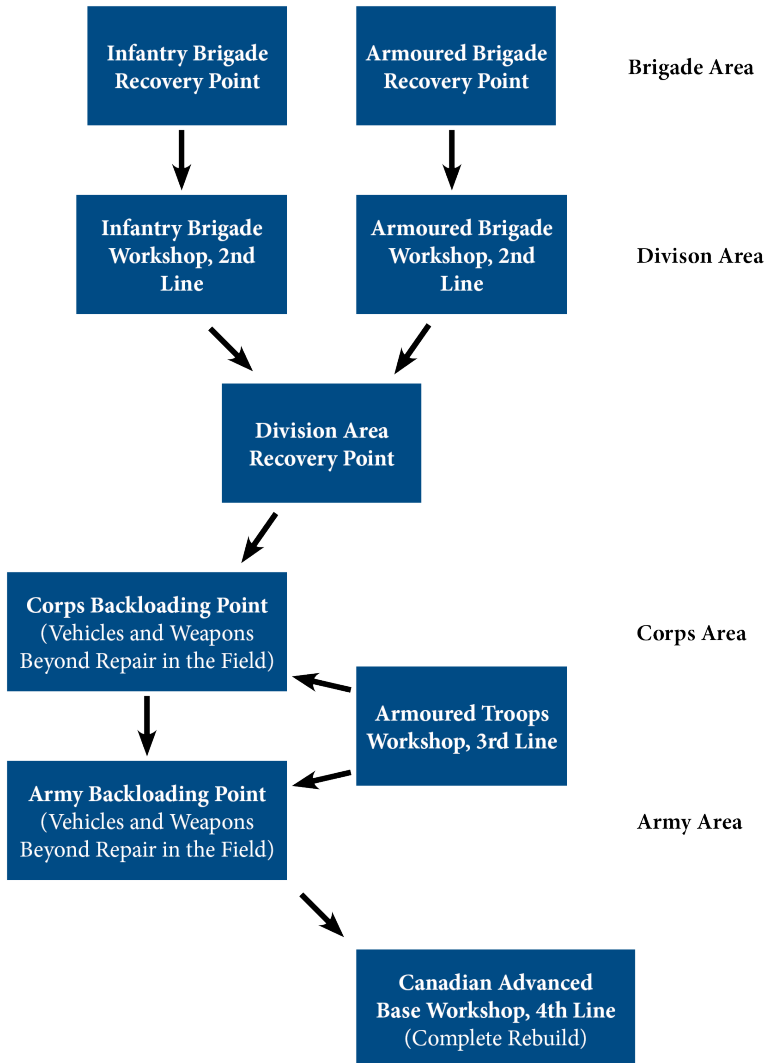


Chart 9: First Canadian Army process for “A” & “B” vehicle and major weapons system recovery and repair.(Armoured Division example).⁶⁰

the strategic route-clearing and recovery role past the corps and divisional areas of responsibility. Prior to August 1944, there was little vehicle and equipment back-loading above the regimental and brigade level due to the small area within the Normandy beachhead. As the breakout from Normandy developed in August 1944, these activities increased as broken-down vehicles were littered across northern France.⁵⁹

Once repairs were completed, the vehicle or piece of ordnance would be sent on its way. Using an AFV as an example, once it was deemed “fit” by a repair line of maintenance, it was immediately shipped back to the relevant squadron of the 25th CADR. At that point, it would be sent off strength (SOS) of the RCME unit that had worked on it and was now on the strength with the 25th CADR squadron. Once the 25th CADR squadron delivered it, the AFV would join the strength the armoured or RCA artillery unit, and the circle was complete. At its height in May 1945, the RCME repair organization was large and extremely capable. A total of 150 RCME units and sub-units existed, from the LAD detachments within combat arms units to fourth-line maintenance facilities located in static locations.

In conclusion, this article has presented a short overview of Canadian Army recovery, repair and replacement procedures and its performance record in maintaining the maximum number of operational “A” and “B” vehicles and major weapons systems during its campaign in NWE 1944-1945. Canadian Army personnel utilizing these procedures proved extremely effective at maintaining vehicle and weapon strength within the CAO. The existence of effective RCME, ROC and 25th CADR procedures and operations are historically significant due to their being largely responsible for maintaining the combat strength of the Canadian Army in the late war period. The CAO in NWE was very lucky to employ what were largely British Army procedures which had evolved by trial and error during 1939-1943 into a very sophisticated system in the late war period. During the Italian campaign in 1943-1944, the Canadian Army had opportunity to practice these methods in the field. On its arrival in NWE, familiar practices were put into action with excellent results. Canadian

⁵⁹ Ibid, 62.

⁶⁰ LAC, RG24 Volume 10,663. First Canadian Army Plans Diagram of AFV “A” vehicle recovery, repair and replacement. File 215C1.045 (D12).

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combat arms regiments were never hindered in their operations due to any sort of shortage of “A” or “B” type vehicles or major weapons systems.

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ABOUT THE AUTHOR

Captain Arthur Gullachsen, PhD is a Regular Force member of the Canadian Army who was posted to the Royal Military College of Canada’s History Department in 2016 after receiving a PhD in History from the University of Western Ontario. His dissertation “An Army of Never-Ending Strength” examines the Canadian Army Overseas reinforcement and replacement of personnel and equipment losses in North West Europe 1944-45. This article is a modified chapter from this dissertation, which is being transformed into a book manuscript.